

5.2a Proportions

**Proportion** - an equation stating that two ratios are equivalent

**Proportional** - when two quantities form a proportion

i.e.  $\frac{2}{6}$  and  $\frac{1}{3}$     i.e.  $\frac{6}{4}$  and  $\frac{8}{12}$

$\frac{2}{6} \div \frac{2}{2} = \frac{1}{3}$

$\frac{6}{4} \div \frac{2}{2} = \frac{3}{2}$

$\frac{1}{3} \rightarrow \frac{1}{3}$

$\frac{8}{12} \div \frac{4}{4} = \frac{2}{3}$

proportional

disproportional

Ex. 1  $\frac{4}{6}$  and  $\frac{18}{24}$

$\frac{4}{6} \div \frac{2}{2} = \frac{2}{3}$

$\frac{18}{24} \div \frac{6}{6} = \frac{3}{4}$

Disproportional

Ex. 2  $\frac{5}{45}$  and  $\frac{3}{27}$

$\frac{5}{45} \div \frac{9}{9} = \frac{1}{9}$

Proportional

$\frac{3}{27} \div \frac{9}{9} = \frac{1}{9}$

Ex. 3  $\frac{50}{10}$  and  $\frac{125}{25}$

$\frac{50}{10} \div \frac{10}{10} = 5$

Proportional

$\frac{125}{25} \div \frac{25}{25} = 5$

**Cross product** - in the proportion  $\frac{a}{b} = \frac{c}{d}$ , the products a.d and b.c are cross products

i.e.  $\frac{2}{3} = \frac{4}{6}$   
 $2 \cdot 6 = 3 \cdot 4$   
 $12 = 12$

i.e.  $\frac{6}{4} = \frac{8}{12}$   
 $6 \cdot 12 = 4 \cdot 8$   
 $72 = 32$

Ex. 4  $\frac{14}{21} = \frac{8}{12}$

$\frac{14}{21} \div \frac{7}{7} = \frac{2}{3}$

$21 \cdot 8 = 14 \cdot 12$

$168 = 168$

proportional

Ex. 5

x	1	2	3	4
y	7	8	7	10

$\frac{1}{7} = \frac{2}{8}$

$7 \cdot 3 = 1 \cdot 9$

$21 = 9$

disproportional

Ex. 6 12 players from 21 teams  
 15 players from 24 teams

$\frac{12 \text{ players}}{21 \text{ teams}} = \frac{15 \text{ players}}{24 \text{ teams}}$

$12 \cdot 24 = 15 \cdot 21$

$288 = 315$

disproportional